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# GASOLINE PRICES AS AFFECTED BY INTERLOCKING STOCKOWNERSHIP AND JOINT COST

## SUMMARY

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THE Federal Trade Commission's *Report on Gasoline Prices in 1915*<sup>1</sup> is one of several reports on the oil industry which have been issued by that body or are in preparation. Two Senate resolutions — one from Senator Owen (1913), the other from Senator Gore (1914) — directed investigations concerning the relative profitableness of refining the different kinds of crude oil and the results of the decree which provided for the dissolution of the Standard Oil Company in 1911. Acting partly under these resolutions and partly under the general powers conferred upon it, the Commission had published a report on pipe-line transportation in the Mid-Continent field, and was proceeding with a general investigation of the petroleum industry, when the great rise in gasoline prices which took place in 1915 led it to inquire into the reasons for the advance. In taking this step it was influenced by the large number of complaints which poured in upon it.

<sup>1</sup> Report on the Price of Gasoline in 1915, Washington, Government Printing Office, April 11, 1917.

## I. GASOLINE PRICES AND PROFITS

Roughly speaking, in the six months between July and December, 1915, the price of gasoline advanced by from seven to nine cents per gallon, an increase of from 75 to 85 per cent. At the same time, the quality of gasoline declined, the Commission's report stating that probably "the average gallon of volatile mineral oil sold under the name of gasoline had a Baumé test at least  $1.5^{\circ}$  lower in December, 1915, than it had in January of the same year" (p. 44). It is pointed out that altho improvements in gasoline motors have enabled those of recent construction to consume the less volatile mixtures put upon the market, the motors in use during the period under discussion are the ones to be considered.

The Report finds that the advance in prices is to be explained only in part on a competitive basis. In reaching this conclusion attention is not confined to cost, but "demand and supply" conditions are also considered. The discussion of the latter is interesting as being an attempt to draw semi-quantitative conclusions from statistics of production, stocks, and sales. Between 1914 and 1915 the consumption of gasoline increased about 38 per cent, and the production about 31 per cent. The difference was drawn from stocks, which were lower in the end of the year than at the beginning. The salient conclusion is that these total figures fail to explain the general advance in prices after October, or the differences in advance in different sections of the country. Reasoning from a diagram the Report (p. 57) concludes that "on the basis of competitive demand and supply, and without regard to cost, (1) the price of gasoline would have begun to advance about

June, as in that month stocks were decreasing rapidly while sales were increasing; (2) the price would have continued to advance until the early part of October, for the reason that up to that time decreasing stocks, increasing sales, and stationary production were the rule; and (3) a decline would have followed in December as a result of rapidly decreasing sales, increasing stocks, and a refinery output that was maintained at a maximum." Yet as a matter of fact prices rose sharply from October through December. Further, it is shown that the low price areas in 1915 (Middle West and Pacific Coast) were not generally those of low demand; and also that prices rose in all parts of the country, altho in some territories stocks increased and sales decreased, and in others the reverse was the case.

The Report goes on to state that, since demand and supply cannot be measured with sufficient accuracy to enable the determination of a reasonable market price, resort must be had to a basis of cost. In any event, competitive demand and supply are supposed to work out ultimately a price having a reasonable relation to cost.<sup>1</sup> Moreover a group of companies which has a position of dominance in an industry should act with especial care and moderation with regard to the extent to which it takes advantage of a period of scarcity to raise prices unduly above cost.

Costs are computed in the Report for representative refineries in three ways: (1) average specific cost per gallon of gasoline, (2) by-products method cost per gallon of gasoline, and (3) cost of all products per gallon of crude oil. On all bases, the computations indicate considerably increased margins of profit to the refiners. The margins per gallon of gasoline were generally from one to three cents per gallon greater in December, 1915

<sup>1</sup> Of course, demand and supply may fix prices much above cost during short periods.

than in July. Nine out of the ten refineries covered by the cost figures showed good margins per gallon of crude oil and increases therein during the year (p. 97). Clearly, the increase in prices was greater than was necessitated by increased cost.

This fact is reflected in the large net earnings made by refineries in 1915. One of the most interesting features of the Report is the light it throws on earnings of Standard companies, some of which have never published income accounts. Of the eleven Standard companies covered, all made over 10 per cent on their net investments, and seven made over 20 per cent. The Standard of Indiana earned 36 per cent on its net investment; the Standard of Nebraska, over 37 per cent; the Continental Oil Company (Rocky Mountain territory), 34 per cent. The relatively high and steady returns received by the three Standard companies doing a purely marketing business is notable (p. 109).

As is often the case with those whose business is under fire, the refining companies argued that prices were high because of increased cost of materials. While the advance in crude oil, however, was important, the costs of other materials were so insignificant in amount that such advances as occurred did not have much effect. Acid cost, for example, was about 4/100 cent and caustic soda about 4/1000 cent, per gallon of gasoline.

## II. DOMINANT POSITION OF STANDARD COMPANIES

The gasoline report shows that in 1915 the Standard companies, as classed therein, held over 75 per cent of the stocks of gasoline and made about 65 per cent of the sales of that commodity in the United States. The same companies had about 83 per cent of the exports. Standard producers and pipe lines controlled 70 per

cent of the crude oil stocks toward the end of 1915. It is suggestive of the efficient marketing organization of the Standard group that its members controlled more crude than they owned and sold more gasoline than they produced.

The Commission announces that it has found no direct evidence of collusion among Standard companies. This is not to be taken as final, however, for its investigation has not been completed. The Report points to such indirect evidence as the continued lack of competition among the Standard companies, the maintenance of a division of territory among them, and the existence of a strong community of interest based on interlocking stockholding.

The extent of stockholding in common is indicated to equal about 70 per cent in various producing, pipeline, refining, tank-car, and marketing concerns. Over 50 per cent of the stock of these concerns was held in the names of some twenty-nine persons, such as Rockefeller, Harkness, Pratt, Flagler, Bostwick, Whitney, Archbold, and others well known. Moreover, the officers and directors of the various Standard companies are often large stockholders in potentially competitive Standard concerns. "Thus the president of the Standard of New Jersey, who in 1915 held 6000 shares (\$3,258,000) in his own company, also owned 4575 shares (\$1,029,375) in the Standard of New York, 300 shares (\$207,000) in the Atlantic Refining Company, and 1858 shares (\$1,012,610) in the Standard of Indiana, and 1100 shares (\$480,150) in the Prairie Oil and Gas Company" (p. 145). Altho there appear to have been no interlocking directors, the foregoing condition is enough to create an effective barrier against competition.

Accordingly, one is not surprised to find that the country is divided into eleven distinct marketing terri-

tories,<sup>1</sup> following state lines, and that there is substantially no competition among these territories. It appears that widely different prices obtain among them. When one steps across an imaginary boundary into another "territory," one pays two cents more per gallon for gasoline. One of the most important points made in the Report is that considerable inequalities in price existed, which *corresponded exactly to nothing except arbitrarily maintained Standard marketing territories*. Differences of over eight cents per gallon at times obtained between some of the territories. At first glance these differences might seem to indicate an independent price policy and absence of concerted action. Further consideration, however, indicates that such inequalities could not have existed had there been no artificial division of territory, and, more than that, they could not have existed without the practice of more or less arbitrary price-making by companies having a considerable degree of control within the several "territories" and refraining from competition with one another.

As to degree of control within the several territories, the Report estimates that in nine of the eleven territories the particular Standard company doing business marketed over 50 per cent of the gasoline in 1915, and in one other territory (Pacific Coast) the Standard's 48 per cent gave it a substantially dominant position. It is indicated that in New England, New York, Pennsylvania, Delaware, and Ohio, Standard companies had about 70 per cent of the business. Accordingly the Standard market is generally followed by the so-called independents, including, by their own admission, such large companies as The Texas Company, and the Gulf

<sup>1</sup> One small exception exists in Arkansas; in this state the Standard of Louisiana (owned by the Standard of New Jersey) and the Magnolia Petroleum Company (70 per cent of whose stock was owned by officers in the Standard of New Jersey and the Standard of New York) both did business.

Refining Company. Moreover, some indication of a variation of profits among Standard companies according to degree of control is to be seen, tho the information available is not full enough to make this certain. If the December "net backs" to the refineries (i. e., wholesale price minus freight and marketing cost) are taken as indicative of the extent to which the companies took advantage of the situation, there appears a rough correspondence of the amount of advantage taken with degree of control, the net back being highest in the case of the Standard of New York and lowest in the case of the Magnolia Petroleum Company. The diagrams showing the course of prices at representative points indicate also that prices were advanced earliest in those territories in which there was the greater control.<sup>1</sup>

Most of these general statements are subject to some exceptions. Thus in the territory of the Standard of Indiana, where the Standard company had 60 per cent of the gasoline business, the price was not advanced until nearly the middle of September. The situation in this territory, however, is peculiar in that it is here that the Standard company has met its most persistent competition. During the summer of 1915 it maintained a very low price, apparently for the purpose of gaining on its competitors; and it went so far that it not only seriously threatened their existence, but it actually sold below its own current cost of production for a time in the area occupied by its most active competitors. This is the most serious particular charge against Standard companies which can be based upon the Report.

No uncertainty can remain in the mind of the reader of the Report as to the effectiveness of the dissolution decree of 1911. While the decree is not attacked, but

<sup>1</sup> Some significance may also be attached to the fact that the two lowest percentages of net earnings shown were made by companies which were among the three having the lowest percentage of control. For the other of the three, the net earnings are not shown.



is regarded as an experiment — perhaps worth while trying at the time it was handed down — the chapter on “Position of the Standard Companies in the Industry” concludes with the words, “it is the Commission’s judgment that in the oil industry the experiment of dissolving corporations without separating owners has not achieved the purpose of establishing effective competition.” Combination was not destroyed; it remained, in the shape of a community of interest; and the territories as established have been carefully maintained. This last fact would appear to have special significance, inasmuch as the Supreme Court mentioned as one evidence of intent to monopolize, “the system of marketing which was adopted by which the country was divided into districts and the trade in each district in oil was turned over to a designated corporation within the combination and all others were excluded.”<sup>1</sup> The recommendations made in the Report show that the Commission believes that the decree requires modification, the suggestion being made at one point “to enact into law the doctrine as to diverse ownership of competing corporations which has been laid down by the courts in the Union Pacific, Reading and other recent cases” (p. 164).

### III. REMEDIES PROPOSED

For remedying the conditions disclosed, four measures or groups of measures are proposed: (1) limitations on interlocking stockownership, (2) segregation of pipe lines, (3) publicity of statistics, (4) a degree of standardization of product. It will be observed that the first two proposals look toward the increase of competition by removing the barriers which community of

<sup>1</sup> 221 U. S. 77.

interest raises against the operation of that force; the second two are primarily calculated to make more effective the competition which now exists or may hereafter be established.

All through the Report runs the idea that the absence of effective competition among Standard companies is due to community of interest based on interlocking stockownership. Five possible courses of action are suggested to remedy this condition, some of these being alternatives. (a) It is suggested that on the basis of the facts disclosed in the Report, the Attorney-General may deem advisable some further action under existing law. In view, however, of the care taken by the several Standard companies to comply with the letter of the dissolution decree and the lack of any direct evidence of collusion among them, this step does not appear probable. More promising are the various proposals for new legislation. (b) It is suggested that the Federal Trade Commission Act be amended so that when there has been a technical compliance with a decree of dissolution, but the desired results have failed to arise, it shall be the duty of the Attorney-General to file a bill of review with the court entering the decree. The court will then be compelled to reopen the case, and the findings of the Commission concerning competition and the like will be final evidence as to fact. A modified decree may be the result. Such a measure would appear to be constitutional and would provide a reasonable elasticity in regulation, according to changing industrial conditions. It would, however, work but slowly and might not be sufficiently drastic in some cases. (c) Perhaps the most drastic of the proposals adopted by the Commission is the prohibition of interlocking stockownership in the case of industrial corporations which have been dissolved under the Sherman anti-trust law. The former

constituents of the Standard Oil combination would be reached and stockholders therein would be compelled to dispose of stock in all but one of such constituents. One possible objection to this proposal lies in its narrow application, since some dissolved corporations among which there is stock held in common may be in no need of further attack, while, on the other hand, in many cases competition among corporations which have not been dissolved may be more or less restricted by the same means. Another possible objection is that so disturbing an operation as compelling the sale of stock may not be necessary and that the end may be achieved in another way with less harmful results.

Accordingly, to meet these possible objections, a more general measure is proposed but one capable of being used less drastically, namely (*d*) to withdraw from all owners of stock in any two or more potentially competitive corporations the right to vote or hold office or otherwise exercise power of control in more than one of such corporations. This provision might be subject to evasion, but properly placed penalties might enforce it. If enforced, it would immediately prevent those who hold stock in two or more companies from becoming officers or directors in those companies, and from voting their stock. This would minimize the operation of community of interest. It would ultimately lead to a large reduction in interlocking stockholding by inducing sale.

To prevent interlocking stockownership is the fundamental remedy for a large part of the restriction of competition in the oil industry. If, however, this remedy is not adopted, the Report suggests as a last recourse, (*e*) taking the bull by the horns and treating the companies as one. Recognizing the fact of common ownership, it might be possible to hold the common owners liable for

those unfair acts which result from their common interest. Thus, if price discriminations occurred between the "territories" of different companies, they would be dealt with as discrimination practised by a single company. There can be little doubt that one result of the dissolution decree has been that great inequalities in price can exist among the different territories of companies owned by the same individuals without subjecting the common owners to suit under Federal anti-discrimination law. The Standard of Indiana, for example, can maintain prices at a ruinously low level while the Standard companies in Ohio, Kentucky, Nebraska, and Montana get high prices.

Of course, the great danger of the last proposal lies in its recognition of unity among the companies. It might operate to bring them closer together in their price policies and thus lead to price regulation. Something like this must come, however, if competition fails.

A distinct phase of interlocking ownership is that which involves the relation among the different stages in the industry. In this respect the Report contains a recommendation that the ownership of pipe lines be segregated from ownership in the other branches of the petroleum industry. The recommendation is in accord with the general recognition of the strategic position held by transportation agencies of the common carrier type, and is in line with the "commodities clause" legislation. The Commission's investigation has clearly shown that the control over pipe lines has been one of the great advantages of Standard companies and that these transportation agencies have not been available to their competitors on the basis of reasonable rates and conditions of service. In the Pennsylvania region a group of small independent refiners has been stunted through dependence upon a limited supply of crude oil furnished to them through Standard pipe lines.

Perhaps the chief objection to the segregation of pipe lines lies in the difficulty of financing to which this policy would give rise. Pipe lines have generally been constructed by refining interests, and chiefly to meet their own requirements for raw material. The investment has been virtually a part of the refining company's investment. There is a considerable element of risk in constructing a pipe line, since the quantity of oil in a given pool is uncertain; but oil must be delivered to the refinery and consequently the investment must be made. If the pipe line were put strictly on its own basis, it is argued that no one could be found willing to make an investment so uncertain. On the other hand, it is to be pointed out that oil production is becoming more scientific and oil resources better known, thus reducing risk. Moreover, if refineries must have pipe lines they will pay for the services of these agencies what may be necessary to attract capital to them. It is doubtful if in the long run this payment would be any greater than the cost under present conditions; but if it were, would the equality of conditions secured not be worth the increase, from a public point of view ?

The two proposals looking toward a more perfect working of existing competition concern correct information and standardized product. The argument in the Report for publicity of correct statistics is of considerable interest to the economist. The forces of demand and supply are supposed, under competition, to establish a price which will tend to clear the market and which will tend to fix a normal price at cost plus normal profit. This supposition, however, is based on the further assumption that competitors, both buyers and sellers, are informed at least as to the facts of supply. If ignorance prevails concerning production and stocks — to say nothing of demand conditions — buyers and

sellers work in the dark, and there is nothing to insure a balance of demand and supply. It is doubtful, under such circumstances, if any appreciable tendency toward the most desirable equilibrium exists, and certainly such a tendency may be so delayed in operation as to lack practical significance. The door is also kept open for manipulation. In almost every investigation undertaken by the Federal Trade Commission it has appeared that such price irregularities or excesses as have occurred have been materially facilitated by ignorance of the true condition of "the market," with the attendant uncertainty or even panic. This has been true of other articles, such as news-print paper and of coal. It was true of gasoline. One jobber is quoted in the Report as follows: "I suppose it cost me \$50,000 last year (1915) for lack of knowledge. If we had had any way to know the true conditions, we could have protected ourselves in the market." In short, we cannot count upon a close adjustment between demand and supply when demand and supply conditions are not known. Economists should stress this more in their theories of value, and statesmen should consider it in passing laws for the purpose of correcting unreasonable prices.

As to standardization, it is clear that when no man knows what he is buying no man can buy intelligently, and competition must do its work blindfolded. Gasoline as sold in 1915 is shown in the Report to have ranged from 57° to 65° Baumé test. More than this, it had ceased to be a homogeneous product and in its name were sold blends of heavy naphtha or "cracked" residual products combined with more volatile elements. The Report recommends that Congress define what shall be sold in interstate commerce as "gasoline." This, of course, would not prevent the sale of inferior motor fuels, but it would prevent their sale under a misleading name.

## IV. PRICES AND JOINT COST

The heart of the Report lies in its chapter on cost and margins; and to the economist this chapter is of interest because of the light it throws on the problem of "joint cost." Obviously petroleum refining involves "joint cost" to a great extent; out of a barrel of crude oil are produced such different things as gasoline and coke, lubricating oil and asphalt, not to mention kerosene and fuel oil.

As a first step in cost analysis, the computations based upon a gallon of crude oil may be noted (pp. 221 f., 95 f.). These show the actual book cost of the crude and the average cost of refining it. Then the value of all the products obtained from the gallon of crude is computed. The difference is the current operating margin per gallon of crude oil consumed. A common condition in 1915 would be that of a plant whose crude cost \$3.40 per hundred gallons; refining added ninety cents more; total cost would be \$4.30. Out of this crude as chief products came twenty-one gallons of gasoline worth \$2.00 at the refinery; thirty-five gallons kerosene worth \$1.60; twenty gallons of fuel oil worth fifty cents; and eleven gallons of lubricating oil worth \$1.70. The total value of these chief products, \$5.80, taken alone, would have given a margin of \$1.50 per hundred gallons of crude. Actual margins in 1915 ranged from losses in some months up to profit margins over \$3.00 per hundred gallons of crude refined.<sup>1</sup>

But this does not reveal anything as to the specific cost of gasoline. In attempting to segregate this cost, one's first thought is to strike a sort of average by prorating the total cost — crude plus refining — equally

<sup>1</sup> Several refining companies consumed over 500,000,000 gallons of crude in 1915.

among all gallons of products. This method would give, in the second six months of 1915, average costs ranging all the way from \$2.62 per hundred gallons of product up to \$6.39 per hundred gallons. Clearly, with fuel oil piling up at a price of \$3.00 per hundred gallons, and kerosene selling at \$4.50, over half of the quantity of products from the crude must be sold at a loss, if costs were thus figured. On the other hand, gasoline at \$13.00 per hundred gallons and lubricating oil at \$15.50 would yield an unreasonably high margin above such an average cost.

The situation is that these different products are all necessarily produced, and that they must be produced in certain rather closely fixed proportions. If the refiner, when kerosene could not be sold at the average cost, could cease to make it, or at least reduce its output largely, he would so decrease the supply as to bring about an advance in price which would bring it up to the average cost. Similarly (still supposing he could vary his products at will) he would produce more of gasoline, so that its price would tend to fall toward the average cost. If the demand for kerosene were so lacking in intensity that no one would pay the average cost, no kerosene would be made under the conditions supposed. On the other hand, if the demand for gasoline were so intense that it could all be sold for more than any other product, the refiner on the same assumption, would produce nothing but gasoline. There would be a tendency for price to conform to average cost.

But — perhaps unfortunately — under present methods over 50 per cent of the crude oil refined *must* go into kerosene and fuel oil classes of products. No effort or sacrifice can make a given crude yield over 50 per cent of gasoline and lubricating oils by commercially successful methods. Consequently the production cannot



readily be varied in proportion to changes in the market prices of the products, and prices cannot be said to have a tendency to equal average cost. In fact, cost loses a large part of its price-determining significance. When one has thousands of barrels of kerosene piling up in one's tanks, one can't wait for prices to rise to an average cost before one sells it. And this is especially true when one can sell one's gasoline for enough above average cost to cover the "loss" on kerosene. In fact, cost may become little more than a mere question of commercial expediency, and be imputed to that one of the necessarily joint products which can best bear it in the judgment of the refiner.

When one of the joint products is clearly the main product, in the sense that any others are merely incidental to its manufacture, the situation is relatively simple; for then the entire cost of the business may be properly charged to the main product and receipts from the sale of the incidental by-products<sup>1</sup> be applied toward reducing its cost. This is not a case of true economic joint cost. And this is what certainly exists in part of the oil refining industry. Some small refineries, known in the trade as "skimming plants," are run almost solely to produce gasoline, the balance of the crude content being thrown into kerosene and fuel oil

<sup>1</sup> The term "by-products" is used loosely. Obviously it has a significance which is largely if not entirely relative. It may be applied to one of several equally important products, or to some product which is incidental to a chief product and which has little or no economic importance. The "by-product" may or may not be necessarily connected with the production of the main product; and the necessity, if it exists, may lie in the physics or chemistry of the situation or in economy. What is generally a "by-product" may be so large a part of the output of some producers as to be their chief product, perhaps on account of special advantage. The writer would suggest that economists confine their use of the term to any product which is necessarily attached to the production of some main product or products, and which is so unimportant as a source of income as to be unnecessary to the existence of the industry concerned. This would make the class, "by-products," a species of the genus "joint product." Further suggestion along this line will be found in the writer's article on "Joint Costs with Especial Regard to Railways" published in this Journal, February, 1916.

which are sold for what they will bring. Even at larger and more elaborately equipped plants this condition has been approximated. Accordingly, the Report lays most stress upon what is called therein the by-products method, pointing out, however, that the costs of gasoline so computed are maximum figures and not costs at all in the strict sense of the term. On this basis gasoline costs, at various refineries, varied from about \$4.50 to \$8.65 per hundred gallons in the second half of 1915 — as compared with an *average* cost of from \$2.62 to \$6.39.

When there is no single main product, but several products exist which can be sold for more than the average cost, the situation is naturally different. This is especially true when the several main products are each and all essential to the profitable conduct of the business. Thus an eastern refinery, having to pay considerable transportation costs on its Oklahoma and Mexican crude oil, could hardly afford not to work its crude more intensively than a "skimming plant." In such a case lubricating oils, for example, may become a second main product, and consequently it would not be logical to bring them with other products as a credit to gasoline cost. This is a case of true economic joint cost, and is much more difficult to handle than the case of a single main product.

In the Report, the method pursued is to use the average cost of all products as the cost of gasoline,<sup>1</sup> when products other than gasoline show a gain rather than a loss as compared with their average cost. In other words, profits on by-products, when regularly received, are not deducted from the cost of the main product (p. 87 f.). Obviously this is but a rough way of dealing with the problem, and could not be used at all if

<sup>1</sup> The "average specific cost of gasoline" might have been used more logically, but there is little difference between the two figures.

separate costs were being worked out for both gasoline and lubricating oil, to say nothing of other products.

If an attempt were to be made to ascertain the costs of two or more main joint products, the logical procedure (as a practical matter) would appear to be to assign specific costs directly and to divide the remainder of total cost between them on the basis of gallons produced, making allowance for differences in value when these are such as to indicate truly the relative intensity of normal demands. Then receipts from other products should be deducted from the costs so ascertained in such a way as to bring them as closely as possible to average specific cost.<sup>1</sup> In this way "losses" on other products would be divided in proportion to ability to bear.

It is to be observed that the apportionment of cost among the various joint products is much affected by the relation among the prices received for such products. The low prices recently prevailing in the refined oil (kerosene) market have directly necessitated the apportionment of losses on kerosene to the cost of gasoline. Incidentally, this has tended to decrease the output of refined oil and to increase that of gasoline. As already pointed out, however, there are narrow limits within which supply adjustments can be effected; and this of course is the great reason why the cost (and price) of one joint product must depend in part upon the price of the other.

This situation introduces a "what the traffic will bear" policy into gasoline prices, a sort of taxation power being given to the seller. Kerosene will not stand much of a charge and is sold cheap, while gasoline will bear a high price and is levied upon accordingly. The danger in this absence of a definite cost basis is

<sup>1</sup> Thus those costs which were most in excess of average specific cost would be first credited with receipts from by-products, tending to reduce all gradually to the normal level.

twofold: first, that discrimination will be practised; second, that prices which are absolutely too high will be exacted. To take up the latter point first, the trouble obviously lies in the fact that no cost is known for any one of the several refinery products. When the refiner can ask " what is the cost of gasoline, kerosene, fuel oil, and lubricating oil ? " and no one can answer — what is to prevent prices from going too high ? Even where there is competition it must work blindly and uncertainly if no one knows the bottom price. Where little effective competition is found, as in the gasoline industry, a large margin is likely to be secured. A contributing factor has been the dense ignorance concerning the investment and earnings of the chief refining companies. The large net earnings received by most of the refiners in 1915, and known to have been received for years by Standard companies, certainly are consistent with the foregoing reasoning.

As to the discrimination — using the term in a non-legal sense — it manifests itself (1) in the wide difference in price between gasoline and kerosene, (2) in the wide differences in price between different sections of the country, (3) in the existence of " quantity discounts " and " allowances " in the same locality. These things would not have existed to the extent that they have in the gasoline business had the cost of gasoline been known and not been inextricably mixed up with that of other products.

But just as in the field of railway rates we may search for the reasonable rate, so here we may inquire what is a reasonable price for gasoline. To begin with, the return from the sale of the joint products must be such as to yield no more than a reasonable return on the investment, which of course will depend partly upon risk. This seeming truism has a direct practical bearing upon

the problem in hand, for with a total charge for all products no greater than what will yield a reasonable return on investment, the prices on the several products under competition would normally be adjusted so as to correspond as nearly as possible to the average cost (including necessary profit) per gallon of product.<sup>1</sup> Average cost is simply total fair price of all products (including reasonable profit) divided by gallons of product. If, then, kerosene could not be sold in competition for the average cost, the excess of average cost over price would justly be charged to gasoline or other high-demand product. The maximum normal price that can be justified under competition for gasoline is accordingly the average cost<sup>1</sup> plus the excesses of average cost over prices received for other products.

The idea may be expressed in another way. Having ascertained the sum which is necessary to yield a reasonable return on investment, the reasonable average margin of profit can be computed. When some of the joint products yield a margin over average cost which is less than this reasonable average margin, the deficiency is charged to those products which yield more — say in the ratio of their profitability over a series of years — and at the same time any excess in the total margin is cut down, the reduction being adjusted among the high-profit products on a progressive basis. The result is a total margin which yields a fair return and which is fairly adjusted among the joint products.

It is indicated in the Report that the costs and prices of July, 1915, resulted in sufficient margins on gasoline to the Standard refiners. As these margins were computed according to the by-products method, which charges to the cost of gasoline the excesses of average

<sup>1</sup> However, if there were an important item of specific cost directly assignable to one product it would probably be allocated first and only the balance assigned.

cost of other products over their prices, and, as this method has the significance indicated in the preceding paragraph, it would seem that the excesses in the December margins over those of July were not justified under competitive conditions. In the cases of several companies the December excess was in the neighborhood of three cents per gallon, and one might infer from the Report that prices about three cents lower than those charged in December would have been sufficient.

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